

A New, Purified *Dermatophagoides farinae* Allergen Preparation

Evaluation with SPT and RAST Techniques

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A purified, standardized and characterized allergen preparation of the house dust mite *Dermatophagoides farinae* (Df) was evaluated by skin prick test (SPT) and radioallergosorbent test (RAST) in 88 subjects. Skin reactions to the purified Df preparation and a corresponding crude Df preparation were compared. SPT was also performed with a crude *Dermatophagoides pteronyssinus* (Dpt) preparation to compare reactions obtained with the two mite preparations. By SPT the purified Df allergen preparation was representative of the crude Df preparation ($r = 0.78$) and the correlation between skin reactions to Df and Dpt was high ($r = 0.78$). The concordance between results obtained with RAST and SPT techniques with the purified Df preparation was high (84%). The purified *D. farinae* preparation was well tolerated and is well suited for SPT.

Key words: allergens; mites; radioallergosorbent test; skin tests.

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CLINICAL ASPECTS

In skin prick testing (SPT) the purified Df preparation was found to be representative of the crude Df preparation from which it was produced. The high correlation between skin reactions (SPT) on Df and Dpt extracts suggests that either preparation can be used for SPT in diagnostic work in clinical practice. In some patients it seems necessary to perform both SPT and RAST when using the purified Df preparation as a diagnostic tool.

Substantial work has been devoted to the study of house dust and the allergens of importance for development of so-called house dust allergy. Today we know that mites of the genus *Dermatophagoides* are important constituents and sources of the allergens in house dust in many parts of the world (8, 20, 24, 27, 28, 29, 31, 32).

House dust extracts are still used in diagnostic and even in therapeutic work in clinical practice, although extracts of Df and Dpt have mostly replaced them today.

Allergen preparations must be reliable in diagnosis and effective in therapy. Most crude extracts are heterogeneous mixtures with undefined allergen content and containing irrelevant antigenic proteins and carbohydrates. Some extracts may contain irritants and other unwanted or even dangerous substances (1, 19, 22). For many reasons purified allergen preparations are preferred to crude extracts (1, 30). The optimal allergen preparation should contain the allergens present in the allergen source and no other substances (30). Kwong (16) con-

Responsible for the patient testing at the participating centres were: T.-E. Børge-Ask, Otorhino-laryngological Dept., Fylkesjukhuset, Molde; E. Florvaag, Dept. for Lung Diseases, Haukeland sykehus, Bergen; K. Johnsen, Otorhino-laryngological Dept., Sentralsykehuset, Skien; O. M. Langaker, Dept. for Lung Diseases, Sentralsjukhuset i Rogaland, Stavanger; A. Ruud, Dept. for Lung Diseases, Sentralsykehuset, Kristiansand.

cludes that an improved allergen extract is one with the irritant components removed by dialysis, containing active antigenic material and having allergenic activity defined by *in vivo* and *in vitro* methods.

The *Df* preparation (Nyegaard & Co. A/S, Oslo, Norway) used in this study was purified, characterized and standardized as previously described for Spectralgen® Timothy (11, 12, 13) and is supplied as a stable, freeze-dried and easily soluble substance. In this trial we wanted to study how the new preparation functioned in the two diagnostic tests SPT and RAST.

The aim of this study was to determine 1) if the purified *Df* preparation was representative of the crude *Df* preparation in SPT, 2) the correlation between SPT results with crude extracts of *Df* and of *Dpt* and, 3) the concordance between SPT and RAST results with the purified *Df* preparation in the same patient.

MATERIAL AND METHODS

Design

The study was carried out at two otorhinolaryngological departments and three departments for lung diseases at coast hospitals in Norway. SPT was performed in duplicate with three allergen preparations, each in two concentrations. RAST was performed with the purified *Df* preparation and two commercially available discs. The testing was carried out open for practical reasons and because we consider the chance for being biased when marking all the skin reactions as negligible.

Patient material

122 adult persons were tested during the period November 1979 to March 1980. Diagnosed mite allergic patients, patients with other allergies, and "healthy volunteers" were included. According to case histories and the results from the *in vivo* and *in vitro* tests in this study, the subjects fell into three groups:

Subject group 1. Positive history of house dust mite allergy, RAST class 1, 2, 3 or 4 tested with

Phadebas® d1 (= *Dpt*) and/or d2 (= *Df*) disc, positive SPT ($A \geq 50\%$) on two or more of the six allergen test preparations. (A = allergenic activity, see under Methods).

Subject group 2. Atopic patients with questionable history of house dust mite allergy, RAST class 0 tested with Phadebas d1 and/or d2 disc and negative SPT ($A < 50\%$) on at least five of the six allergen test preparations. Atopic patients with other allergies, e.g. pollen allergy, mould allergy, etc. were also included in this group.

Subject group 3. "Healthy volunteers", individuals with no history of any allergic disease.

Results in 88 of the 122 subjects tested qualified for further calculations (see under Methods). These 88 subjects made up the three groups mentioned above (Table 1).

Patient sera

Sera were obtained from 73 of the 88 accepted patients described above. A serum pool was prepared of unequal volumes of 36 sera from another group of patients with suspected clinical mite allergy and positive RAST to Phadebas d1 or d2 discs.

Allergen preparations

D. farinae extracts. Isolated and crushed *D. farinae* mites were obtained from Allergen AB

Table 1
Subject groups, age and sex of the subjects

Subject groups		Sex		Age (years)	
Group No.	No. subjects	F	M	< 40	> 40
1	43	11	32	41	2
2	33	16	17	31	2
3	12	8	4	10	2
Total	88	35	53	82	6

Group 1: mite allergic patients.

Group 2: atopic patients. Mite allergy negative or questionable.

Group 3: "healthy volunteers".

(Sweden) and extracted overnight at 6°C as a 2.5% (w/v) solution in a buffer of 0.125 mol/l ammonium bicarbonate with 2% (v/v) *n*-butanol (pH 8.0, 25°C). The suspension was centrifuged (27,000 *g*, 1 h, 0°C) and filtrated (Acropor 0.8 μ). The clarified filtrate was denoted Crude *Df* and stored freeze-dried.

A purified freeze-dried preparation, Spectralgen Mite, *D. farinae* was obtained from Nyegaard & Co. A/S (Norway).

The purification had been performed from the Crude *Df* extract, removing material of both high (*Mw* > 70,000 daltons) and low (*Mw* < 5,000 daltons) molecular weight.

Dilutions with glycin were prepared from both bulk preparations, sterilfiltrated, distributed in vials and freeze-dried once more in N_2 -atm. Before SPT the vials were reconstituted with diluent containing 50% glycerol and 0.5% phenol in sterile water to give the denoted allergen concentrations and a final concentration of 0.25 g/l glycin.

D. pteronyssinus extract. Isolated and crushed *Dpt* mites were obtained from Allergon AB (Sweden). Crude *Dpt* extract was prepared as the Crude *Df* extract, but freeze-dried only once. The bulk preparation was distributed immediately in vials before freeze-drying.

Preliminary estimation of allergen activity. According to the manufacturer, the concentration of 3 μ g/ml dry material Spectralgen Mite *D. farinae* has an allergen activity of 1000 BU/ml.

In order to produce dilutions of corresponding allergen activity for SPT, a preliminary RAST-inhibition experiment was performed comparing the Crude *Df* and Spectralgen Mite *D. farinae* preparations in 10-fold dilutions using the Phadebas d2 discs and a patient serum pool.

The extract concentration giving 50% inhibition was recorded. It was calculated that 7.6 μ g/ml dry material was the concentration of crude extract corresponding to an allergen activity of 1000 BU/ml. It was further anticipated that the quantity of allergens extracted from an identical quantity of isolated *Df* and *Dpt* was of the same size.

Control preparations for SPT. Histamine solution 1 mg/ml (with 0.50% phenol) provided a positive control and the diluent a negative control.

Methods

Skin prick test (SPT). SPT was performed according to the procedure described by Aas et al. (2). A mean wheal diameter of <2 mm was considered negative. If wheal reaction on duplicate tests differed more than 20% from the mean diameter of the duplicate in more than two of the six test preparations, no calculations were performed on results obtained in that subject.

Based on individual skin reactions the allergenic activity (A) of each test preparation was calculated as follows: Skin reaction of test preparation in per cent of that of the histamine solution, $100 \times (D_1 + d_1)/(D_2 + d_2)/2$, where D_1 and d_1 represent largest and smallest diameters of test preparation, D_2 and d_2 represent largest and smallest diameters of histamine solution. Late skin reactions and possible systemic reactions were recorded.

RAST. Phadebas d1, *Dpt* and d2, *Df* discs were obtained from Pharmacia (Sweden).

Spectralgen Mite *D. farinae* (0.2 and 1.0 g/l dry weight) were coupled to CNBr-activated paper discs according to Ceska et al. (7). The discs were denoted Disc 1 and Disc 2 respectively.

RAST was performed as recommended by Pharmacia with the RAST-kits using these allergosorbents, and the results were expressed as uptake of ^{125}I -anti-IgE (Phadebas Isotope Unit, Pharmacia) in per cent of the total applied, or in RAST classes as recommended by the Phadebas manufacturer. All results were means of duplicate analyses.

RAST-inhibition

A RAST-inhibition experiment was performed, using the Phadebas d2 discs and a patient serum pool. The patient serum pool was diluted prior to the inhibition experiment to give a RAST-class 3 (Phadebas RAST-class). The experiment was performed as described for

RAST, except for an overnight pre-incubation of the pooled serum with allergen extract prior to the addition of allergosorbent. 25 µl pooled serum and 25 µl of 10-fold dilutions of Crude *Df* or Spectralgen Mite *D. farinae* were incubated in individual test tubes. The extract concentration giving 50%, was recorded.

The RAST-results obtained with 25 µl serum and 25 µl buffer, and with only 50 µl buffer were used in the calculations as the 0% and 100% inhibition value respectively.

Estimation of purification ratio

When SPT is performed in a patient group with various concentrations of one preparation, it is assumed that the following equation can be applied:

$$\log \bar{A} = k_1 + k_2 \log c$$

$\bar{A}$ is the mean allergenic activity obtained using a test preparation of concentration c . k_1 and k_2 are constants which mean that the equation between $\log \bar{A}$ and $\log c$ is the equation of a straight line.

The mean allergenic activity reflects the allergen concentration. Based on the data obtained in the present investigation and in others, it was assumed that the allergenic activity obtained with both *Df* preparations, reflected the concentration of the same *Df* allergens (9).

The purification ratio of Spectralgen Mite *D. farinae* in relation to the Crude *Df* extract, was estimated in this way:

K_1 and k_2 were determined to be 1,7325 and 0,1399 respectively by means of the $\bar{A}$ -values obtained with the two concentrations of Crude *Df* in subject group 1 (Table 4). The $\bar{A}$ -values obtained with the two concentrations of Spectralgen Mite *D. farinae* were 112 and 138, and from the equation $\log \bar{A} = 1,7325 + 0,1399 \log c$ the corresponding concentrations of Crude *Df* were calculated to be 184 and 816 µg/ml dry material, giving a purification ratio of about 6.

Statistical analysis

The SPT data were processed using a logarithmic transformation. The correlation coefficient

(r) was calculated both for not transformed and transformed SPT data. The correlation coefficient (r) was calculated according to the method described by Hjort (14).

RESULTS

Totally, 122 subjects were tested with SPT with three allergen preparations, the purified *Df* preparation, Crude *Df* and Crude *Dpt*, in two concentrations, 10,000 and 50,000 BU/ml. Only the results obtained in 88 subjects were accepted for further calculations, see under Methods. Median and range of the skin reactions to histamine solution in the 88 subjects are given in Table 2. RAST was performed on sera from 73 of the 88 subjects using the following four discs:

Disc 1 and Disc 2 with the purified *Df* preparation, Phadebas d1 and d2.

To compare skin reactions on the purified and the Crude *Df* preparations in the same patient, the A values of the purified *Df* preparation 50,000 BU/ml are plotted against A values of Crude *Df* 50,000 BU/ml (Fig. 1).

Comparison between the skin response to the two mites is presented in Fig. 2. A values of Crude *Df* 50,000 BU/ml are plotted against A values of Crude *Dpt* 50,000 BU/ml obtained in the same patient. In Fig. 3 the RAST results with Phadebas d1 and d2 discs in the same patient are plotted.

In order to present SPT and RAST results in a simple way, in relation to the practical diagnostic situation, the results have been classified

Table 2
Skin prick test (SPT) reaction of histamine solution 1 mg/ml (median and range) in 88 subjects

Tester	No. subjects	SPT reaction (mm) (median and range)
1	16	6.3 (4.9–8.2)
2	28	6.3 (5.0–8.1)
3	15	6.3 (4.4–9.8)
4	23	7.0 (2.3–9.7)
5	6	5.5 (4.4–6.0)
Total	88	6.3 (2.3–9.8)

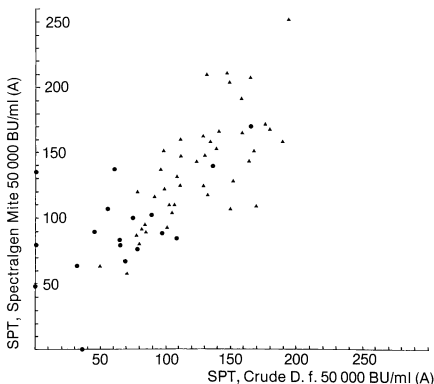


Fig. 1. Comparison of SPT results (allergic activity, A) in 88 subjects tested with Spectralgen Mite *D. farinae* 50,000 BU/ml and with Crude *Df* 50,000 BU/ml. $\blacktriangle$: subject group 1; $\bullet$: subject group 2; $\circ$: subject group 3. 15 of the $\bullet$ are *in origo*, 12 of the $\circ$ are *in origo*.

as positive or negative. A positive SPT result is defined as $A \geq 50\%$ on two or more of the six allergen preparations, negative as $A < 50\%$ on all, or all but one, of the six allergen preparations. A positive RAST result is RAST class 1, 2, 3 or 4, negative is RAST class 0.

The RAST results with the two discs with the purified *Df* preparation showed one discrepancy out of 73 (Table 3). Concordance (positive/positive or negative/negative) between SPT and RAST results with Disc 1 was observed in 61 of 73 subjects tested (84%). The results are presented separately for the three subject groups in Table 3.

The concordance between SPT and RAST results in the same individual is almost total in subject groups 1 and 3. A subject with positive SPT result also has a positive RAST result and *vice versa*. The subjects in group 2 separate into two distinct groups: 17 SPT negative subjects

with negative RAST with the purified *Df* preparation in 11 out of the 12 subjects tested, and 16 SPT positive subjects, on 14 of them, RAST with the purified *Df* preparation was performed, six were positive and eight negative.

Twelve of the 33 subjects in group 2 had negative SPT results on one or more of the allergen preparations in concentration 10,000 BU/ml and, at the same time, positive SPT results on one or more of the allergen preparations in concentration 50,000 BU/ml. The RAST results for these patients varied from class 0 to class 3, with mostly negative results.

In the group diagnosed as mite allergic patients (subject group 1, $n = 43$) the correlation coefficients were calculated based on the reactions obtained in the same patient with a) two concentrations of one preparation, b) two different preparations, and c) two different techniques, SPT and RAST (Table 4). The correla-

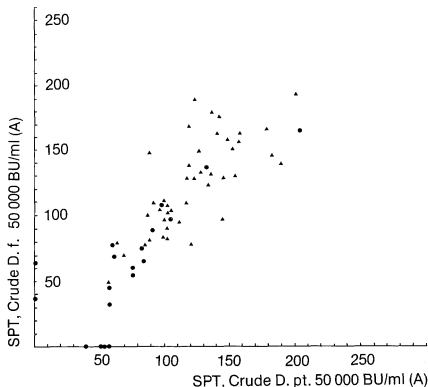


Fig. 2. Comparison of SPT results (allergic activity, A) in 88 subjects tested with Crude *Df* 50,000 BU/ml and with Crude *Dpt* 50,000 BU/ml. $\blacktriangle$: subject group 1; $\bullet$: subject group 2; $\circ$: subject group 3. 14 of the $\bullet$ are *in origo*; 12 of the $\circ$ are *in origo*.

tion coefficient calculated for SPT results obtained by testing two concentrations of the purified *Df* preparation was carried out as a control.

Correlation coefficients obtained for logarithmic transformed A-values were higher than correlation coefficients obtained for not transformed A-values ($r = 0.75$, $r = 0.80$ compared with $r = 0.70$, $r = 0.72$).

The purification ratio of the purified *Df* preparation relative to Crude *Df* was estimated to be about 6.

RAST results with Disc 1 and Disc 2 with the purified *Df* preparation correlated well ($r = 0.98$). The mean of the RAST results (% of total activity) with Disc 1 and Disc 2 was also quite similar, 19.7 and 21.1 respectively.

The day after testing four of the 122 subjects tested reported some kind of late skin reaction

with wheals from about 10 to 15 mm in diameter. In two cases the reactions occurred only on one of the forearms. In two of the patients the reactions occurred with all test preparations, and in two patients with one test preparation – the purified *Df* preparation 50,000 BU/ml and Crude *Df* 50,000 BU/ml respectively. No systemic reactions occurred in connection with the skin testing.

DISCUSSION

The skin reactions to histamine solution (Table 2) varied insignificantly from centre to centre and are considered to be at an acceptable level according to the recommendations (2). The mean skin reaction to the histamine reference solution should be ≥ 4 mm. Thus, it should be justified to compare results between centres.

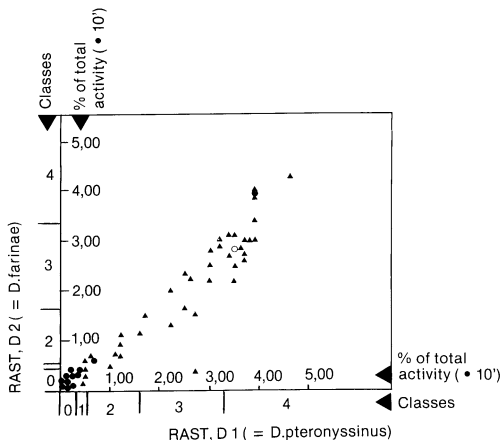


Fig. 3. Comparison of RAST results with Phadebas d2 (= *D. farinae*) and Phadebas d1 (= *D. pteronyssinus*) in 72 subjects. $\blacktriangle$: subject group 1; $\bullet$: subject group 2; $\circ$: subject group 3. 13 of the $\bullet$ are in *origo*; 6 of the $\circ$ are in *origo*.

Correlation between allergenic activities of the purified Df preparation and Crude Df

Purified allergen preparations must contain all the important allergens in the allergen source. This can be controlled by RAST and CIE/CRIE techniques and also by comparative skin testing and provocation testing. In our SPT experiments (Fig. 1) a high degree of correspondence was seen between allergenic activities obtained with the purified *Df* preparation and with Crude *Df*. No patient had a markedly greater skin reaction to Crude *Df* than to the purified *Df* preparation.

In subject groups 2 and 3 SPT resulted in negative skin reaction in many subjects. Correlation coefficients based on these zero A-values

will be high and will not present a comparison of allergenic activities of the two preparations.

Correlation coefficients have been calculated on results obtained in the homogeneous subject group, group 1 (diagnosed as mite-allergic patients) (Table 4). The correlation coefficients based on logarithmic transformed data were chosen, as these A-values showed a better fit towards a linear regression model. The correlation coefficient obtained between SPT results with the purified *Df* preparation and Crude *Df* ($r = 0.78$) was very close to that obtained when SPT was performed with one preparation in two concentrations: the purified *Df* preparation 10,000 BU/ml and 50,000 BU/ml ($r = 0.80$). This correlation coefficient indicates the degree of variability in skin test procedure at the five

centres and variability in skin sensitivity in our subject material. In this study, the obtained correlation coefficient ($r = 0.78$) is almost as high as it is possible to obtain in comparative SPT.

Consequently, the purified *Df* preparation seems to be fully representative of the crude extract. The purified *Df* preparation will probably function equally well in SPT as Crude *Df*.

It is likely that the allergenic activity of the two *Df* preparations is due to the same mite allergens (9), and the purification ratio of the purified *Df* preparation relative to Crude *Df* was calculated to be about 6.

The purification ratio obtained in SPT is higher than indicated in the preliminary RAST-inhibition experiment. This is most probably due to the serum-pool used in this experiment. This RAST-inhibition was performed in order to make preparations of suitable concentrations for testing, and the serum-

pool used consisted of unequal volumes of sera from another patient group.

Correlation between allergenic activities of Crude *Df* and Crude *Dpt*

Fig. 2 shows that there is a high degree of correlation between the A values obtained with Crude *Df* and with Crude *Dpt* extracts. For the same reason as mentioned above, the correlation coefficient has been calculated on results obtained in subject group 1. The correlation coefficient between SPT results with Crude *Df* and with Crude *Dpt* ($r = 0.78$) was as high as the

Table 3

SPT and RAST results classified as positive (SPT: A $\geq 50\%$ on 2 or more of the 6 allergen preparations, RAST: Class 1, 2, 3 or 4 on Spectralgen Mite, *D. farinae* discs) or negative (SPT: A $< 50\%$ on all or all but one of the 6 allergen preparations, RAST: Class 0 on Spectralgen Mite, *D. farinae* discs)

Sub- ject group	Test (No. subjects)	Result
1	SPT (43)	43 positive
	RAST (40)	38 positive 1 negative 1 discrepancy between Disc 1 and Disc 2
2	SPT (33)	16 positive 17 negative
	RAST (26)	16 SPT positive: 6 RAST positive 8 RAST negative 17 SPT negative: 11 RAST negative 1 RAST positive
3	SPT (12)	12 negative
	RAST (7)	6 negative 1 positive

Table 4

Correlation coefficients (r) obtained in SPT and RAST in subject group 1 (mite allergic patients). Comparisons performed: SPT with different concentrations of one preparation, SPT with different preparations and SPT/RAST with Spectralgen Mite, *D. farinae*

		SPT ($n = 43$)	
Preparation		Crude <i>Df</i> 50,000 BU/ml (380 μ g d.m./ml) $\bar{A} = 124$	Spectralgen Mite <i>D. farinae</i> 50,000 BU/ml (150 μ g d.m./ml) $\bar{A} = 138$
SPT ($n = 43$)	Crude <i>Df</i> 50,000 BU/ml (380 μ g d.m./ml) $\bar{A} = 124$	n.d.	0.78
	Crude <i>Df</i> 10,000 BU/ml (76 μ g d.m./ml) $\bar{A} = 99$	0.75	n.d.
	Spectralgen Mite <i>D. farinae</i> 10,000 BU/ml (30 μ g d.m./ml) $\bar{A} = 112$	n.d.	0.80
RAST ($n = 40$)	Spectralgen Mite <i>D. farinae</i> , Disc 1	n.d.	0.51

d.m. = dry material.

$\bar{A}$ = mean of the A-values obtained in SPT.

n.d. = not determined.

correlation obtained in SPT with one preparation in two concentrations ($r = 0.80$). As shown in Figs. 2 and 3 our results suggest that if a patient is SPT and RAST positive against *Df*, the patient will also be positive if tested with *Dpt*, and *vice versa*.

Other skin test studies with extracts of the two mites have given similar results (4, 20, 24). Spijsma & Voorhorst (23) conclude that the two mites are sources of the same allergen. Others (4) suggest that, in addition to a major allergen common to house dust (*Df* and *Dpt*), other allergens are present in house dust extracts. Mumcuoglu (20) indicates a common cross-sensitizing capacity between the mite species *Df*, *Dpt* and *Euroglyphus maynei*. In addition, it is suggested that the three mite species contain specific allergens. Results from *in vitro* studies indicate that extracts of *Df* and *Dpt* have antigens (10) and major- and intermediary allergens (17) in common.

Our SPT and RAST results are in agreement with other studies with *Df* and *Dpt* extracts. The results may suggest that there exists immunological identity or partial identity in the human IgE system.

Our findings indicate that for routine skin testing, only one test preparation, *Df* or *Dpt*, seems to be necessary.

The results from this study are quite promising, also regarding the purified *Df* preparation used in hyposensitization: the purified *Df* preparation is representative of the crude preparation, the purified *Df* preparation is a very pure preparation (purification ratio is about 6) and a high degree of cross reactivity seems to exist between *Df* and *Dpt* extracts in SPT.

Concordance between SPT and RAST results

Considering positive SPT and positive RAST in the same patient, the correspondence between results obtained with the two test methods was high, as was the correspondence between negative SPT and negative RAST (84% concordance). Almost all subjects in group 1 and group 3 showed complete concordance (both positive or both negative) between SPT and RAST. The high concordance between SPT and RAST in

group 3 ("healthy volunteers") indicates that SPT with the purified *Df* preparation gives few false positive skin reactions.

Subject group 2 is very heterogeneous. The inclusion criteria for this group were wide, including seasonal and perennial allergic patients. Not surprisingly, many of those patients were negative both in SPT and RAST. In this group nine patients showed discrepancy between SPT and RAST results: eight patients were positive in SPT and negative in RAST, one patient negative in SPT and positive in RAST.

When comparing the detailed SPT and RAST results (A values and per cent of total activity) obtained in subject group 1, the correlation coefficient was 0.51 (Table 4).

SPT and RAST are widely used in the diagnosis of house dust and mite allergy (5, 6, 15, 18, 21, 25, 26). Other studies with *Df* preparations (SPT and RAST) in mite allergic patients present similar results to ours (18, 26) with correlation coefficients of 0.56 (18) and 0.61–0.85 (26). The patient material and statistical analysis vary in the different studies, and thus it is of limited value to compare the exact correlation coefficients obtained.

Studies with *Dpt* preparations have also resulted in high correspondence between SPT and RAST results (5, 6, 15, 21, 25).

Consequently, our results are in agreement with others. The correspondence between RAST and SPT results is relatively high, but in some patients it seems necessary to perform both SPT and RAST when using the purified *Df* preparation as a diagnostic tool.

In our study eight subjects in group 2 seem to possess IgE antibodies in the skin, but not in serum, reflecting the difficulties this patient group will present in clinical practice.

Several explanations have been proposed for the discrepancy sometimes observed between SPT and RAST results:

- a) different amounts of specific IgE on mast cells in the skin and in serum,
- b) incomplete coupling of the allergens to the paper discs in RAST

c) participation of different classes of antibodies in the reaction with the allergen (4, 23).

Twelve subjects in group 2 were negative in SPT with the purified *Df* preparation 10,000 BU/ml and positive with 50,000 BU/ml. As the RAST results varied considerably in these patients, a negative SPT with the lowest concentration sometimes was in agreement with the RAST result, sometimes not. Preparations in a higher concentration than 10,000 BU/ml, in our case 50,000 BU/ml, seem to be better suited for SPT in this patient group.

The tolerability and suitability of the mite preparations in SPT was good. Late skin reactions were few and no systemic reactions occurred.

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